

1. (Previously presented): A flame-sprayed copper-aluminum composite material, which comprises copper or a first copper alloy having at least an unmelted phase, and aluminum or a first aluminum alloy having at least a melted phase, formed by flame-spraying an aluminum-alloy powder and a copper alloy powder.

2. (Original): A flame-sprayed copper-aluminum composite material according to claim 1, wherein said first copper alloy comprises a second copper alloy, which is formed by incorporating said aluminum or a component of the first aluminum alloy into the first copper alloy, by flame-spraying.

3. (Previously Presented): A flame-sprayed copper-aluminum composite material according to claim 2, wherein said first aluminum alloy comprises a second aluminum alloy, which is formed by incorporating said copper or a component of the first copper alloy into the first aluminum alloy, by flame-spraying.

4. (Previously Presented): A flame-sprayed copper-aluminum composite material according to claims 2 or 3, characterized in that the main structure consists of the unmelted phase of the copper or the first copper alloy and the melted phase of aluminum or the

second aluminum alloy.

5. (Original): A flame-sprayed copper-aluminum composite material according to claim 4, wherein said flame-sprayed layer surface comprises at least either of the melted phase of copper or the first copper alloy and the melted phase of the first aluminum alloy.

6. (Previously Presented): A flame-sprayed copper-aluminum composite material according to claim 1, wherein said first copper alloy comprises Pb, and said first aluminum alloy comprises Si.

7. (Previously presented): A flame-sprayed copper-aluminum composite material according to claim 6, characterized in that said first copper alloy comprises 40% by weight or less of Pb, and said first aluminum comprises from 10 to 60% by weight of Si.

8. (Original): A flame-sprayed copper-aluminum composite material according to claim 7, characterized in that said first copper alloy contains from 0.5 to 50% by weight of

one or more selected from the group consisting of 30% by weight or less of Sn, 0.5% by weight or less of P, 15% by weight or less of Al, 10% by weight or less of Ag, 5% by weight or less of Mn, 5% by weight or less of Cr, 20% by weight or less of Ni, and 30% by weight or less of Zn.

9. (Original): A flame-sprayed copper-aluminum composite material according to claim 7, characterized in that said first aluminum alloy further comprises 30% by weight or less of Sn.

10. (Original): A flame-sprayed copper-aluminum composite material according to claim 7, characterized in that said first aluminum alloy further comprises at least one element of the group consisting of 7.0% by weight or less of Cu, 5.0% by weight or less of Mg, 1.5% by weight or less of Mn, 1.5% by weight or less of Fe, 8% by weight or less of Cr, and 8.0% by weight or less of Ni.

11. (Original): A flame-sprayed copper-aluminum composite material according to claim 10, characterized in that said first aluminum alloy further comprises 30% by weight or less of Sn.

12. (Original): A flame-sprayed copper-aluminum composite material according to claim 8, characterized in that said first aluminum alloy further comprises 30% by weight or less of Sn.

13. (Original): A flame-sprayed copper-aluminum composite material according to claim 8, characterized in that said first aluminum alloy further comprises at least one element of the group consisting of 7.0% by weight or less of Cu, 5.0% by weight or less of Mg, 1.5% by weight or less of Mn, 1.5% by weight or less of Fe, 8% by weight or less of Cr, and 8.0% by weight or less of Ni.

14. (Original): A flame-sprayed copper-aluminum composite material according to claim 13, characterized in that said first aluminum alloy further comprises 30% by weight

or less of Sn.

15. (Original): A flame-sprayed copper-aluminum composite material according to claim 7, characterized in that the entire composition is Cu: 8-82% by weight, Al: 5-50% by weight, Pb: 32% by weight or less, and Si: 5-50% by weight.

16. (Original): A flame-sprayed copper-aluminum composite material according to claim 8, characterized in that the entire composition is Cu: 8-82% by weight, Al: 5-50% by weight, Pb: 32% by weight or less, Si: 5-50% by weight, Sn: 24% by weight or less, P: 0.4% by weight or less, Ag: 8% by weight or less; Mn: 4% by weight or less, Cr: 4% by weight or less, Ni: 16% by weight or less, and Zn: 24% by weight or less.

17. (Original): A flame-sprayed copper-aluminum composite material according to claim 9, characterized in that the entire composition is Cu: 8-82% by weight, Al: 5-50% by weight, Pb: 32% by weight or less, Si: 5-50% by weight, and Sn: 21% by weight or less.

18. (Original): A flame-sprayed copper-aluminum composite material according to claim 10, characterized in that the entire composition is Al: 15-50% by weight, Cu: 8-50% by weight, Pb: 32% by weight or less, Si: 5-50% by weight, Mn: 1.2% by weight or less, Cr: 5% by weight or less, Ni: 4% by weight or less, Mg: 4.0% by weight or less, and Fe: 1.2% by weight or less.

19: (Original): A flame-sprayed copper-aluminum composite material according to claim 11, characterized in that the entire composition is Al: 15-50% by weight, Cu: 8-50% by weight, Pb: 32% by weight or less, Si: 5-50% by weight, Sn: 24% by weight or less, Mn: 1.2% by weight or less, Cr: 5% by weight or less, Ni: 4% by weight or less, Mg: 4.0% by weight or less, and Fe: 1.2% by weight or less.

20. (Original): A flame-sprayed copper-aluminum composite material according to claim 12, characterized in that the entire composition is Al: 15-50% by weight, Cu: 8-50% by weight or less, Pb: 32% by weight or less, Si: 5-50% by weight, Sn: 30% by weight or less, Mn: 4% by weight or less, Cr: 4% by weight or less, Ni: 16% by weight or less, and

Zn: 24% by weight or less.

21. (Original): A flame-sprayed copper-aluminum composite material according to claim 13, characterized in that the entire composition is Al: 15-50% by weight, Cu: 8-50% by weight, Pb: 32% by weight or less, Si: 5-50% by weight, Sn: 24% by weight or less, P: 0.4% by weight or less, Ag: 8% by weight or less, Mn: 5% by weight or less, Cr: 8% by weight or less, Ni: 20% by weight or less, Zn: 24% by weight or less, Mg: 4.0% by weight or less, and Fe: 1% by weight or less.

22. (Original): A flame-sprayed copper-aluminum composite material according to claim 14, characterized in that the entire composition is Al: 15-50% by weight, Cu: 8-50% by weight, Pb: 32% by weight or less, Si: 5-50% by weight, Sn: 30% by weight or less, P: 0.4% by weight or less, Ag: 8% by weight or less, Mn: 5% by weight or less, Cr: 8% by weight or less, Ni: 20% by weight or less, Zn: 24% by weight or less, Mg: 4.0% by weight or less, and Fe: 1% by weight or less.

23. (Previously Presented): A flame-sprayed copper-aluminum composite material according to claim 3, wherein at least a portion of said first copper alloy, consists of Cu crystals, and at least a portion of said first aluminum alloy, consists of Al crystals.

24. (Previously Presented): A flame-sprayed copper-aluminum composite material according to claim 6, characterized by further containing 30% by weight or less of graphite particles.

25. (Previously Presented): A flame-sprayed copper-aluminum composite material according to claim 1, characterized by further containing 30% by weight or less of one or more selected from the group consisting of  $Al_2O_3$ ,  $SiO_2$ , SiC,  $ZrO_2$ ,  $Si_3N_4$ , BN, AlN, TiN, TiC,  $B_4C$ , iron-phosphorus compounds, iron-boron compounds, and iron-nitrogen compounds.

26. (Previously Presented): A flame-sprayed copper-aluminum composite material according to claim 1, wherein it is laminated on a substrate and is coated with a metal layer



which is softer than the substrate.

27. (Original): A flame-sprayed copper-aluminum material according to claim 26, wherein said soft metal layer is a plating layer of Pb, Pb alloy, Sn or Sn alloy.

28. (Original): A flame-sprayed copper-aluminum material according to claim 26, wherein said soft metal layer is a plating layer mainly consisting of Pb and Sn.

29. (Original): A flame-sprayed copper-aluminum material according to claim 2 or 3, characterized in that said flame-sprayed surface layer is coated with a film, which comprises MoS<sub>2</sub> or graphite or a mixture of MoS<sub>2</sub> and graphite.

30. (Previously Presented): A method for producing a copper-aluminum composite material, comprising flame-spraying material containing powder of copper or copper alloy and powder of aluminum or aluminum alloy such that a portion of these powders is melted and a portion is not melted.

31. (Original): A method for producing a copper-aluminum composite material according to claim 30, characterized in that the main structure of the copper-aluminum composite material is combination of one or more of (a) melted structure of copper or copper alloy, (b) unmelted structure of copper or copper alloy, (c) melted structure of aluminum or aluminum alloy, and (d) unmelted structure of aluminum or aluminum alloy (except for the combination of only (a) and (c) and only (b) and (d)).

32. (Original): A method of producing a copper-aluminum composite material according to claim 30 or 31, wherein said copper alloy is Cu-Pb based alloy, and said aluminum alloy is Al-Si based alloy.

33. (Previously Presented): A method for producing a copper-aluminum composite material according to claim 30 or 31, wherein 30% by weight or less of graphite powder is mixed with the material prior to flame-spraying.

34. (Previously Presented): A method for producing a copper-aluminum composite

material according to claim 30 or 31, wherein 30% by weight or less of one or more selected from the group consisting of  $\text{Al}_2\text{O}_3$ ,  $\text{SiO}_2$ ,  $\text{SiC}$ ,  $\text{ZrO}_2$ ,  $\text{Si}_3\text{N}_4$ ,  $\text{BN}$ ,  $\text{AlN}$ ,  $\text{TiN}$ ,  $\text{TiC}$ ,  $\text{B}_4\text{C}$ , iron-phosphorus compounds, iron-boron compounds, and iron-nitrogen compounds is mixed with the material prior to flame-spraying.

35. (Previously Presented): A method for producing a copper-aluminum composite material according to claim 30 or 31, wherein the flame spraying is carried out on a surface of a metallic substrate, the surface of the metallic substrate having been roughened to RZ 10-60  $\mu\text{m}$  or more prior to flame spraying.

36. (Previously Presented): A method for producing a copper-aluminum composite material according to claim 30 or 31, wherein heat treatment of the flame-sprayed layer is carried out subsequent to the flame spraying.

37. (Currently amended): A flame-sprayed copper-aluminum composite material, which consists of copper or a first copper alloy having at least an unmelted phase, and

aluminum or a first aluminum ~~ally~~ alloy having at least a melted phase.

38. (Currently amended): A flame-sprayed copper-aluminum composite material, which consists of copper or a first copper alloy having at least an unmelted phase, and aluminum or a first aluminum ~~ally~~ alloy having at least a melted phase, formed by flame-spraying an aluminum-alloy powder and a copper alloy powder.